(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 August 2004 (12.08.2004)

PCT

(10) International Publication Number
WO 2004/067376 A2

(51) International Patent Classification[7]: B63H

(21) International Application Number:
PCT/US2004/002750

(22) International Filing Date: 29 January 2004 (29.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/354,353 30 January 2003 (30.01.2003) US

(71) Applicant *(for all designated States except US)*: **AUBURN UNIVERSITY** [US/US]; Office of Technology Transfer, 309 Samford Hall, Auburn University, AL 36849-5176 (US).

(71) Applicant and
(72) Inventor: **SMITH, Joseph, A.** [US/US]; P.O. Box 16951, Mobile, AL 36616 (US).

(74) Agent: **SMITH, Joseph, A.**; P.O. Box 16951, Mobile, AL 36616 (US).

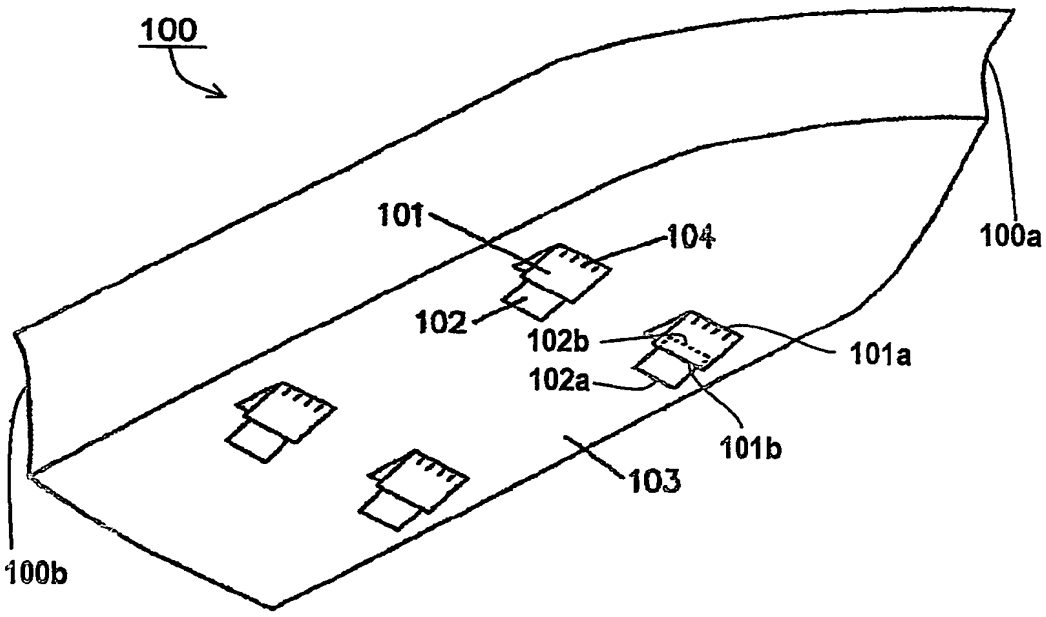
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:
— *of inventorship (Rule 4.17(iv)) for US only*

[Continued on next page]

(54) Title: MARINE HYDRO LIFT FLAPS AND METHODS OF USING SAME



(57) Abstract: An apparatus for improving performance of a vessel, wherein the vessel has a hull 100 having a bottom 103, a bow 100a and a stem 100b. In one embodiment, the apparatus has at least one flap 101, wherein the flap 101 has a forward edge 101a, a rear edge 101 b, and a body portion defined therebetween the forward edge 101 a and the rear edge 101 b, the body portion having an exterior surface 101c and an opposite, interior surface 101 d, and is movably mounted to the bottom 103 of the hull 100 at the forward edge 101 a such that each flap 101 can be moved between a first position and a second position apart from the first position. The apparatus also has means for moving the flap 101 between the first position and the second position.

WO 2004/067376 A2

Published:

— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 August 2004 (12.08.2004)

PCT

(10) International Publication Number
WO 2004/067376 A3

(51) International Patent Classification[7]: B63B 1/22

(21) International Application Number:
PCT/US2004/002750

(22) International Filing Date: 29 January 2004 (29.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/354,353 30 January 2003 (30.01.2003) US

(71) Applicant *(for all designated States except US)*: **AUBURN UNIVERSITY** [US/US]; Office of Technology Transfer, 309 Samford Hall, Auburn University, AL 36849-5176 (US).

(71) Applicant and
(72) Inventor: **SMITH, Joseph, A.** [US/US]; P.O. Box 16951, Mobile, AL 36616 (US).

(74) Agent: **SMITH, Joseph, A.**; P.O. Box 16951, Mobile, AL 36616 (US).

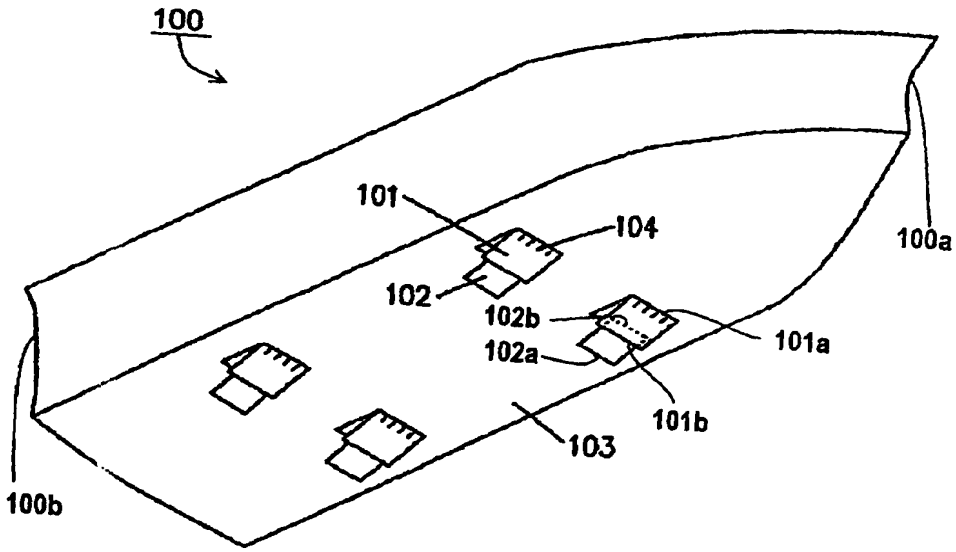
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:
— *of inventorship (Rule 4.17(iv)) for US only*

[Continued on next page]

(54) Title: MARINE HYDRO LIFT FLAPS AND METHODS OF USING SAME



(57) Abstract: An apparatus for improving performance of a vessel, wherein the vessel has a hull (100) having a bottom (103), a bow (100a) and a stem (100b). In one embodiment, the apparatus has at least one flap (101), wherein the flap (101) has a forward edge (101a), a rear edge (101b), and a body portion defined therebetween the forward edge (101) a and the rear edge (101b), the body portion having an exterior surface (101c) and an opposite, interior surface (101d), and is movably mounted to the bottom (103) of the hull (100) at the forward edge (101a) such that each flap (101) can be moved between a first position and a second position apart from the first position. The apparatus also has means for moving the flap (101) between the first position and the second position.

WO 2004/067376 A3

Published:
— *with international search report*

(88) Date of publication of the international search report:
26 May 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.